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椰枣的营养学作用及其在化妆品中的应用现状

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摘要:目的 探讨绿色环保理念下椰枣成为化妆品绿色有机原料的可能性。方法 查阅相关文献,总结椰枣不同部位生物活性化合物的营养学作用及其提取物作为化妆品成分的用途。结果 椰枣果肉含有丰富的糖分、维生素、纤维、矿物质,以及具有抗氧化和抗炎特性的酚类化合物,可促进人体健康;椰枣核富含膳食纤维及膳食矿物质,食用安全;椰枣仁富含生物活性化合物和不饱和脂肪酸,可作为多种化妆品的原材料。椰枣提取物在皮肤化妆品、美发美甲产品中有一定应用潜力,并可用于制造肥皂、减少蛀牙、生产天然蜡等。结论 椰枣经过现代的提取技术处理可转化为有用的化妆品原料。

关键词:椰枣;抗氧化活性;营养成分;化妆品

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Nutritional Function of Dates and Its Application in Cosmetics

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Abstract: Objective To investigate the possibility of dates as the green organic raw material for cosmetics under the concept of green environmental protection. **Methods** Through reviewing the related literature, the nutritional function of bioactive compounds from different parts of dates and the use of its extracts as cosmetic ingredients were summarized. **Results** Date flesh is rich in sugar, vitamins, fiber, minerals, and phenolic compounds with antioxidant and anti-inflammatory properties, which can promote human health. Date pit is rich in dietary fiber and minerals, which is safe to eat. Date kernel is rich in bioactive compounds and unsaturated fatty acids, which can be used as raw materials for many kinds of cosmetics. Date extract has a certain application potential in skin cosmetics, hair and nail products, which can be used to make soap, reduce tooth decay, and produce natural wax. **Conclusion** Dates can be transformed into useful cosmetic materials by modern extraction.

Key words: dates; antioxidant activity; nutritional composition; cosmetics

椰枣树原产于亚洲东南部,生长在热带和亚热带地区,在我国种植于南部亚热带地区。在中东地区的膳食传统中,椰枣是电解质和游离氨基酸的重要来源,此外,当地居民还有将其用于慢性疾病食疗的传统。研究发现,椰枣可降血压,减轻氧化应激反应和机体免疫力的调节,可用于糖尿病、癌症和动脉粥样硬化的治疗^[1-3]。此外,椰枣也含有多种生物活性化合物,如香豆酸、阿魏酸、肉桂酸、黄酮类化合物、原花青素、酚类化合物和水溶性维生素等^[4]。这些化合物可强化骨骼,促进孕妇分娩时子宫收缩,且可预防贫血^[5]。不同部位椰枣均具有较高的营养学价值,椰枣果肉和种子含有丰富的糖分、维生素、纤维和矿物质,椰枣核和椰枣仁富含生物活性化合物,是化妆品行业的重要原材料来源。在此,系统总结了目前椰枣的营养学作用及其中的化学成分在化妆品产品中的应用研究进展。

1 椰枣的营养成分及其作用

1.1 椰枣果肉

椰枣果肉富含糖分和膳食纤维,其中含糖量达70%~80%,多数椰枣品种中的主要糖分葡萄糖、果

糖和蔗糖,易被人体吸收以提供能量^[6];含膳食纤维1.90%~16.95%,其中多为不溶性纤维(84%~94%)^[7]。此外,椰枣果肉还含有多种人体必需和非必需氨基酸,特别是谷氨酸、赖氨酸、丙氨酸、丝氨酸、天冬氨酸、脯氨酸和甘氨酸;也含人体营养必需矿物质,以钾含量最高,磷、镁和钙含量较高,钠含量较低^[8],所含的氟和硒元素可保护牙齿并刺激人体的免疫功能;椰枣果肉脂肪含量较低,但复合维生素B的含量很高^[9];还含有酚类抗氧化剂、单宁色素和表儿茶素低聚物,具有较高的营养价值。

1.2 椰枣核

椰枣核的营养学价值往往是被忽略的部分,其平均质量为椰枣果实的5.6%~14.2%,是重要的植物化学物质来源,含有较高浓度的酚类、甾醇、类胡萝卜素、花青素、原花青素和类黄酮等^[10],富含膳食纤维(67.56%~74.20%),其中不溶性甘露聚糖纤维含量很高;不溶性膳食纤维,如半纤维素、纤维素和木质素是椰枣核纤维的主要成分^[11];多种膳食矿物质,如钾、铜、镁、钙等,其中钾含量最高(229~293 mg/100 g)^[9]。

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椰枣核经加工处理后能成为可安全食用的种子粉和面包^[12]。虽然椰枣核往往被认为是椰枣的副产品,但却是多酚化合物含量较丰富的可食用来源之一,其还含有多种药用化合物,如皮质类固醇,具有抗炎活性,可治疗肾脏、膀胱疾病和传染病,缓解炎症^[13]。

1.3 椰枣仁

椰枣仁提取物和生物活性化合物被认为是开发药物和营养品重要来源^[14],其脂肪酸含量为53.2%~58.8%,多为不饱和脂肪酸,如油酸和亚油酸,而饱和脂肪酸,如棕榈酸和月桂酸的含量较低^[7]。油酸也称为Omega-9单不饱和脂肪酸,是植物中最常见的不饱和脂肪酸,与植物油相比,椰枣来源的油酸具有更高的抗氧化率,可长期储存。椰枣籽油是油酸重要的天然来源^[15],在室温下以液体形式存在,呈亮黄色,气味宜人,由于其多种生物成分和物理化学特性,具有重要的营养学作用。但不同品种椰枣仁中油酸含量存在一定差异。

2 椰枣提取物在化妆品中的应用

2.1 皮肤化妆品

椰枣果肉和种子含多种生物活性化合物,如黄酮类化合物、酚类和酚酸类物质,可防止氧自由基的产生。椰枣籽油已被证实对人体皮肤和头发具有保护作用,且在乳霜和防晒霜方面已经获得了商业化应用批准。椰枣籽油具有高氧化稳定性,可延长化妆品的储存时间,保护皮肤免受紫外线辐射并修复受损的皮肤^[16]。此外,由于椰枣籽油含有可减少皱纹和改善皮肤弹性的植物激素,同样具有抗皱潜力^[17]。椰枣提取物中的维生素C和维生素E可通过刺激真皮成纤维细胞增加胶原蛋白来改善皮肤的含水量,进一步发挥抗皮肤衰老作用^[18]。INES等^[19]的研究发现,质量浓度高于30 μg/mL的椰枣籽油对人体皮肤无毒性。LECHEB等^[20]从椰枣水提取物中配制了一种美容霜,表现出良好的流动性、黏度和流变性。

AHMED等^[21]的研究证实,椰枣提取物使用安全,可作为天然抗氧化剂的重要来源。椰枣籽油含有的酚类化合物可作为一种天然抗氧化剂,有效预防过氧化物引起的氧化应激损伤。还有研究证实了酚类化合物可通过防止光氧化,抵抗微生物和寄生虫感染,从而帮助水果保鲜^[22]。开发环保的酚类衍生物产品,尤其是富含天然原料的产品对于防止皮肤过早老化至关重要,中东国家为此对椰枣的酚类含量和抗氧化能力进行了广泛研究^[23]。但在化妆品配方方面开展的研究工作相对较少,需要更多研究证实化妆品中源自椰枣天然成分的潜在价值。

2.2 美发美甲产品

营养丰富的食物可改善由外部压力和污染引起的

头发氧化损伤,美发产品中植物提取物同样有助于头发护理,促进头发生长和修复并防止脱发^[24]。椰枣所含生物活性化合物中,黄酮类和酚类可防止脱发、促进头发生长,类黄酮可能会增大毛囊,延长头发长度及生长时间^[25],低分子量的化合物可渗透头皮并改善头皮的机械性能,而高分子量的化合物可保护头发并防止降解。研究表明,椰枣籽油富含植物甾醇、必需脂肪酸和维持头皮健康、促进头发正常生长及支持皮脂腺和毛囊的营养功能所需的营养物质^[26]。肉桂酸衍生物和维生素在不同的椰枣品种中均具有较高含量^[27],维生素B和维生素E可用于强化头发和指甲,已在护发产品和保健品中获得应用,其中维生素E可促进头皮细胞的生长、防止指甲老化,并可用于保持指甲水分含量,使指甲具有健康外观^[28];维生素C可保护头发和指甲免受辐射和污染产生的自由基的侵害,还可通过强化皮肤、结缔组织和血管壁来帮助维持健康的指甲。椰枣核粉可用作眼线笔原料,且安全性较高^[29]。

2.3 其他化妆品

合成护肤品含有大量对羟基苯甲酸酯油,这可能会导致敏感皮肤出现过敏反应和皮疹。与对羟基苯甲酸酯相比,椰枣籽油作为化妆品中的天然防腐剂更安全^[30]。同时,椰枣籽油具有抗病毒和抗炎活性^[14],可保护皮肤免受炎性刺激并促进伤口愈合^[31]。椰枣提取物已显示出抗菌和抗氧化活性,已广泛用于肥皂制造^[32]。同时,含有氟的椰枣提取物可减少蛀牙生成^[33]。此外,从椰枣叶中提取的蜡样物质,可为天然蜡的生产提供新的可能性,以满足对于天然蜡稳步增长的需求^[34]。有机提取程序也会影响化合物的可用性和生物活性,使用有机溶剂的传统提取工艺对人类和环境有害且危险,在用于从椰枣核中提取化合物的所有可用清洁技术中,超临界二氧化碳(SC-CO₂)是最佳方法^[35]。

3 结语

椰枣有助于防止氧化应激并增强身体的抗炎活性,椰枣相关副产品的增值产品开发及其在化妆品中的应用可改善皮肤健康。因此,更好地了解椰枣生物活性化合物及其作用机制、提取纯化路线十分关键。目前已认识到椰枣和椰枣籽废料是开发药品、保健食品和化妆品的宝贵来源,尤其是椰枣果和种子作为有价值的新增值产品和其用于化妆品成分的潜在用途。因此,经开发利用后,椰枣有望成为化妆品绿色有机原料的重要来源。

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